

Electro-Voice®

a MARK IV company

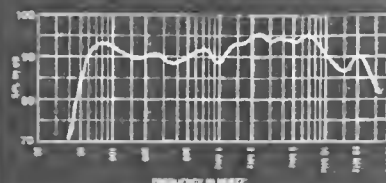


FIGURE 1 — Axial Frequency Response, 4-volts/10 feet

Model SH-1512 Two-Way Stage Speaker System

SPECIFICATIONS

Frequency Response, 10 Feet on Axis,
Swept 1/3-Octave, Half-Space Anechoic
Environment (see Figure 1):

50-20,000 Hz

Low-Frequency 3-dB-Down Point,

Normal:

55 Hz

Step-Down:

50 Hz

Usable Low-Frequency Limit

(10-dB-down point),

Normal:

49 Hz

Step-Down:

44 Hz

Half-Space Reference Efficiency:

1.8%

Long-Term Average Power Handling

Capacity per EIA Standard RS-426A
(see Power Handling Capacity section):

200 watts

Maximum Woofer Acoustic Output:

3.6 watts

Sound Pressure Level at 1 Meter,
1 Watt Input, Anechoic Environment,
Band-Limited Pink Noise Signal, -

300-2,000 Hz:

99 dB

Dispersion Angle Included by 6-dB-Down
Points on Polar Responses, Indicated One-
Third-Octave Bands of Pink Noise,

250-20,000 Hz Horizontal

(see Figure 4):

110° ± 5°

5,000-20,000 Hz Vertical

(see Figure 4):

46° ± 5°

Directivity Factor R_0 (Q), 800-16,000 Hz

Median (see Figure 5):

10.5 (+3.5, -4.0)

Directivity Index D_0 , 800-16,000 Hz

Median (see Figure 4):

10.0 dB (+1.0 dB, -2.0 dB)

Distortion, 0.1 Full Power Input

Second Harmonic,

100 Hz: 3%

1,000 Hz: 3%

10,000 Hz: 14%

Third Harmonic,

100 Hz: 1%

1,000 Hz: 1%

10,000 Hz: 3.5%

Distortion, 0.01 Full Power Input

Second Harmonic,

100 Hz: < 1%

1,000 Hz: < 1%

10,000 Hz: 4.5%

Third Harmonic,

100 Hz: < 1%

1,000 Hz: < 1%

10,000 Hz: < 1%

Transducer Complement,

High-Frequency:

One-inch titanium diaphragm driver

90° x 40° constant-directivity horn

Low-Frequency:

Special design 15" woofer

Box Tuning Frequency,

Normal:

56 Hz

Step-Down:

39 Hz

Crossover Frequency:

1,500 Hz

Crossover Slope:

12 dB per octave

Impedance,

Nominal:

8 ohms

Minimum:

6.3 ohms

Input Connections:

Parallel 1/4 in. phone jacks (allows
paralleling of multiple speakers)

Enclosure Materials and Colors:

Black carpet covered Road-Wood™

Dimensions:

78.7 cm (31 in.) high

53.4 cm (21 in.) wide

37.1 cm (14.6 in.) deep

Net Weight:

35.4 kg (78 lbs)

Shipping Weight:

38.1 kg (84 lbs)

DESCRIPTION

The Electro-Voice SH-1512 is a 200-watt, two-way, high-efficiency, constant-directivity stage system featuring a vented-direct-radiating woofer section. It combines professional quality components arranged in a vertical array with an unusually durable enclosure. The result is cutting, "full" sound quality sometimes preferred in stage system sound reinforcement situations.

The enclosure is constructed of Road-Wood™, a structural material made of layered and selectively oriented hardwood strands strongly bonded together with phenolic resins. This high-strength shell is covered with densely woven, abuse-resistant black carpeting.

The high-frequency section of the SH-1512 utilizes a 90° x 40° constant-directivity horn driven by a one-inch throat, wide-bandwidth titanium diaphragm driver. This driver uses a unique convex drive Time Path™ phasing plug structure (patent pending) for smooth and extended high-frequency performance.

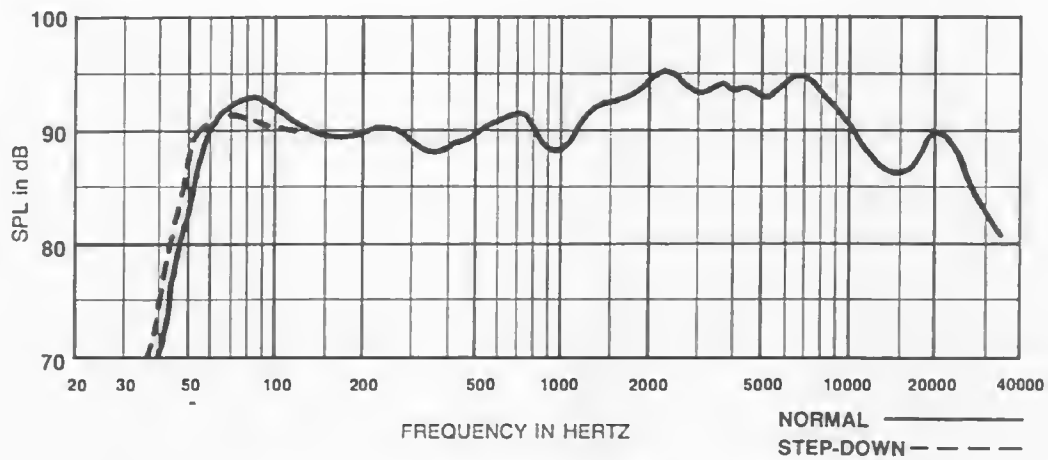


FIGURE 2 — Axial Frequency Response, 4-volts/10 feet
Half-Space Anechoic Environment

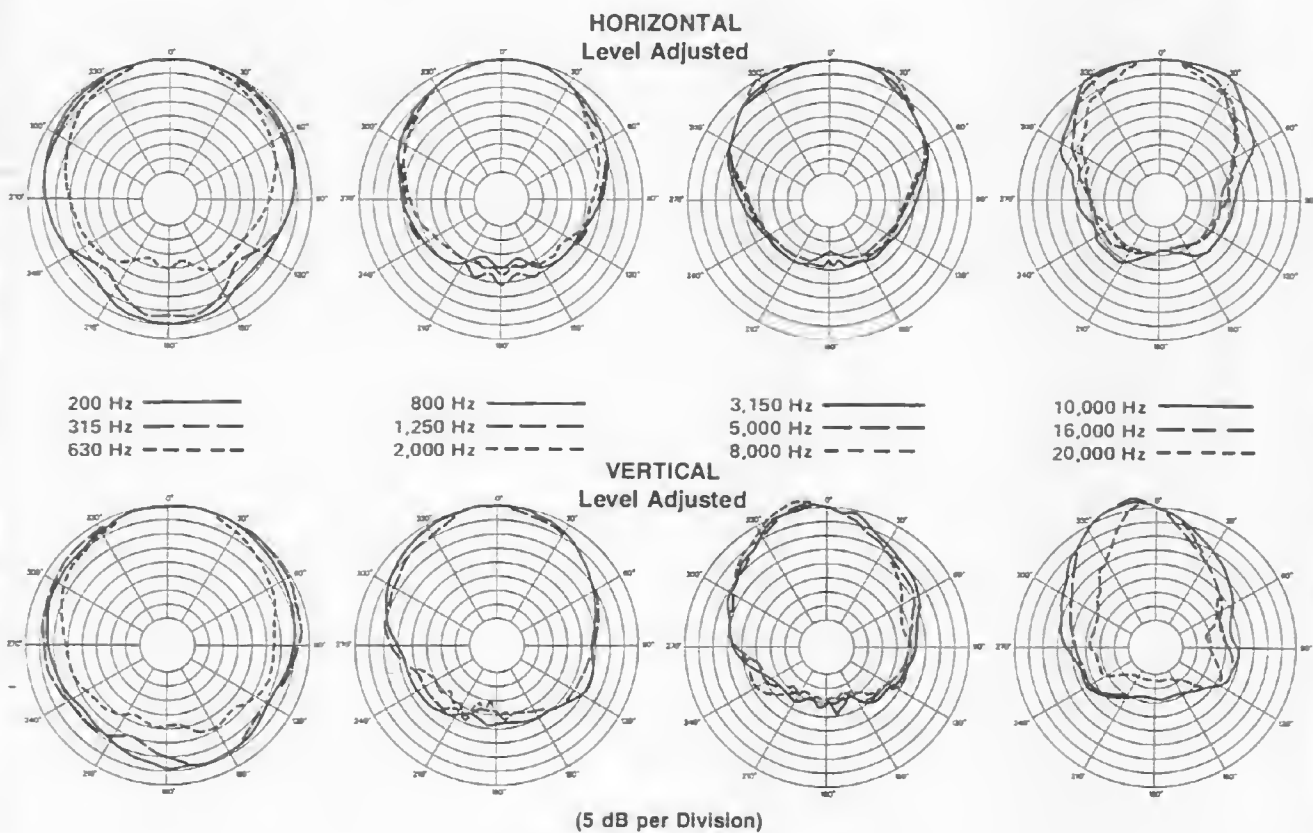


FIGURE 3 — Polar Response
($\frac{1}{3}$ -octave pink noise, 4-volts/10 feet)

The bass section of the SH-1512 is designed using Thiele-Small parameters for efficient performance to below 55 Hz, with provisions for stepping down the tuning to extend performance to below 50 Hz. The 15-inch woofer used is a specially designed unit featuring an extended length voice coil and high-temperature construction materials.

CONSTANT-DIRECTIVITY SPEAKER SYSTEM

The crossover frequency and speaker component geometries have been selected so that the directional characteristics of the woofer and constant-directivity horn match at the crossover frequency (approximately 90° circular coverage patterns for each) to create a special system type — the constant-directivity system. At higher frequencies the horizontal coverage pattern remains constant and the vertical pattern smoothly transitions to a 40° to 50° angle above 5,000 Hz. Response within the 90° x 40° rated coverage angle is uniform, which means dependable audience coverage without "hot spots" or dead zones at certain frequencies. The 90° x 40° dispersion characteristic also helps avoid early reflections from nearby floor or side wall surfaces which could degrade performance. The controlled directivity of the high- and low-frequency transducers also eliminates response irregularities caused by diffraction off nearby enclosure edges.

SELECTABLE LOW FREQUENCY RESPONSE

The unique design of the SH-1512 provides a selection of two low-frequency response curves by the optional use of a removable port plug. In the normal configuration (port plug out), the low-frequency output is maximized in the 50 to 100 Hz region. In the step-down configuration (port plug in), the output below 60 Hz is increased by 30% with the response leveling out in the octave above. This means that the system can be tailored to match the low frequency requirements of the program material. Experimentation is recommended for particular applications.

ENCLOSURE CONSTRUCTION

The SH-1512 enclosure utilizes a structural material that combines the strength of high-quality plywood with the density and acoustic damping of particle board without brittleness. Road-Wood™ uses the same principle of crossbanding veneers, as in plywood, in order to achieve its very high rigidity. A tough liquid-phenolic resin is blended with long, narrow strands of hardwood. Alternate layers are perpendicularly bonded under intense heat and pressure to form panels of superior uniformity. Unlike many grades of plywood, Road-Wood is dimensionally stable, water-resistant and free from voids.

A combination of dado cut joints, tough adhesives and proper bracing ensure a sonically dead enclosure free from panel resonances.

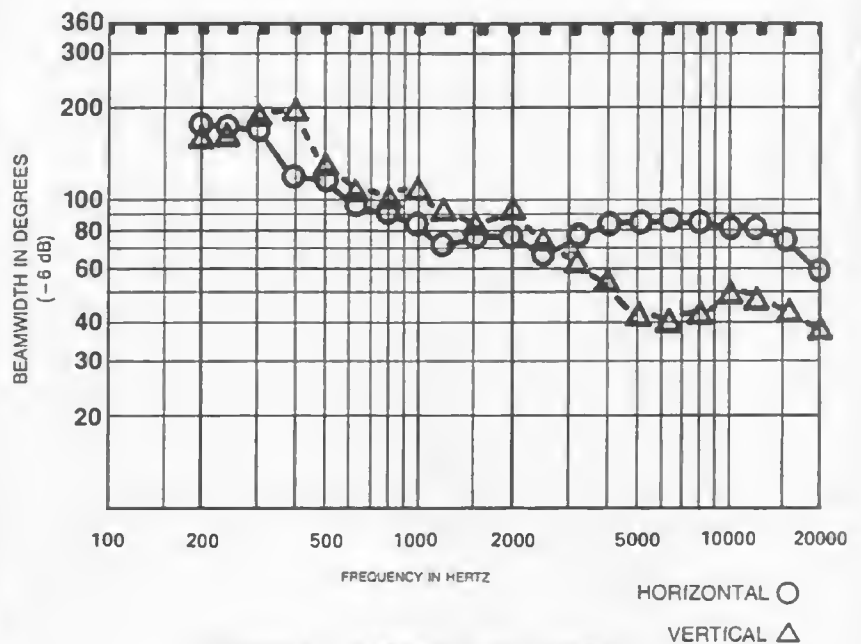


FIGURE 4 — Beamwidth vs Frequency
Whole Space (anechoic)

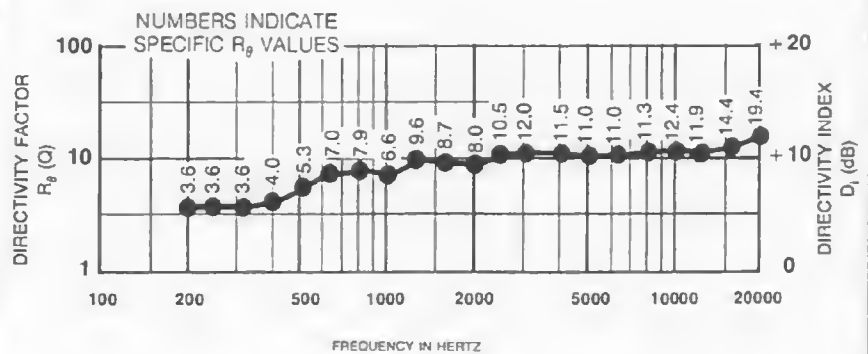


FIGURE 5 — Directivity vs Frequency
Whole Space (anechoic)

The densely-woven, industrial-grade, abuse-resistant carpeting provides a finish that is both attractive and highly durable. Large, heavy-duty metal corner protectors, firmly secured rubber feet, recessed handles and a protective metal grille complete the picture and ensure that the SH-1512 speaker system is ideally suited to a long and reliable life "on the road."

FREQUENCY RESPONSE

The combination of a 15-inch woofer, wide-bandwidth, high-frequency driver and an equalized crossover results in the wide and smooth overall response shown in Figure 2. Curves are shown for both normal box tuning and optional step-down. This response was measured at 10 feet, using a swept $\frac{1}{3}$ -octave input of 4-volts; no external equalization was used.

DIRECTIVITY

A unique feature of the SH-1512 is the constant-directivity dispersion provided by the $90^\circ \times 40^\circ$ horn. The polar response of the system at selected $\frac{1}{3}$ -octave bandwidths is shown in Figure 3. These polar responses were measured in an anechoic environment at 10 feet using $\frac{1}{3}$ -octave pink noise inputs. The frequencies selected are fully representative of the polar response of the system. Beamwidth of the system utilizing the complete $\frac{1}{3}$ -octave polar data is shown in Figure 4. R_p (Q) and directivity index (DI) are plotted in Figure 5.

POWER HANDLING CAPACITY

To our knowledge, Electro-Voice was the first U.S. manufacturer to develop and publish a power test closely related to real-life conditions. First, we use a random noise input signal because it contains many frequencies simultaneously, just like real voice or instrument program. Second, our signal contains more energy at extremely high and low frequencies than typical actual program, adding an extra measure of reliability. Third, the test signal includes not only the overall "long-term average" or "continuous level" — which our ears interpret as loudness — but also short-

duration peaks which are many times higher than the average, just like actual program. The long-term average level stresses the speaker thermally (heat). The instantaneous peaks test mechanical reliability (cone and diaphragm excursion). Note that the sine wave test signals sometimes used have a much less demanding peak value relative to their average level. In actual use, long-term average levels exist from several seconds on up, but we apply the long-term average for several hours, adding another extra measure of reliability.

Specifically, the SH-1512 is designed to withstand the power test described in the revised EIA Standard RS-426A. The EIA test spectrum is applied for eight hours. To obtain the spectrum, the output of a white noise generator (white noise is a particular type of random noise with equal energy per bandwidth in Hz) is fed to a shaping filter with 6-dB-per-octave slopes below 40 Hz and above 318 Hz. When measured with the usual constant-percentage bandwidth analyzer (one-third-octave), this shaping filter produces a spectrum whose 3-dB-down points are at 100 Hz and 1,200 Hz with a 3-dB-per-octave slope above 1,200 Hz. This shaped signal is sent to the power amplifier with the continuous power set at 200 watts into the 6.0 ohms EIA equivalent impedance, (34.6 volts true RMS). Amplifier clipping sets instantaneous peaks at 6 dB above the continuous power, or 800 watt peak (69.2 volts peak). This procedure provides a rigorous test of both thermal and mechanical failure modes.

PORT PLUG INSTALLATION

The step-down tuning for extended low-frequency response can be achieved by the installation of the port plug supplied with the SH-1512. First, the grille must be removed by removing the six grille mounting screws. The port plug is then inserted into either one of the port holes with the port plug flange remaining on the outside of the cabinet. The plug should be pressed in until the flange touches the baffle board insuring an airtight seal. Because of the friction fit the

port plug will remain in place during normal operation and transportation. The plug may be removed by prying the flange outward and pulling.

WARRANTY (Limited)

Electro-Voice Speakers and Speaker Systems (excluding active electronics) are guaranteed for five years from date of original purchase against malfunction due to defects in workmanship and materials. If such malfunction occurs, unit will be repaired or replaced (at our option) without charge for materials or labor if delivered prepaid to the proper Electro-Voice service facility. Unit will be returned prepaid. Warranty does not extend to finish, appearance items, burned coils, or malfunction due to abuse or operation under other than specified conditions, including cone and/or coil damage resulting from improperly designed enclosures, nor does it extend to incidental or consequential damages. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you. Repair by other than Electro-Voice or its authorized service agencies will void this guarantee. A list of authorized warranty service agencies is available from Electro-Voice, Inc., 600 Cecil Street, Buchanan, MI 49107 (AC/616-695-6831), Electro-Voice, Inc., 3810 148th Avenue N.E., Redmond, WA 98052 (AC/206-881-9555), and/or Electro-Voice West, 8234 Doe Avenue, Visalia, CA 93291 (AC/209-651-7777). This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Service and repair address for this product: Electro-Voice, Inc., 600 Cecil Street, Buchanan, Michigan 49107.

Specifications subject to change without notice.



ELECTRO-VOICE, INC., 600 Cecil Street, Buchanan, Michigan 49107

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